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## CLINICAL APPLICATION OF LENS AUTOFLUORESCENCE.

KOFOED P.<sup>1</sup>, LARSEN M.<sup>2</sup> HANSEN T.<sup>3</sup>, PEDERSEN T.<sup>3</sup> LUND-ANDERSEN H.<sup>1</sup><sup>1</sup> Dept. of Ophthalmology, Herlev Hospital, University of Copenhagen (DK)<sup>2</sup> Dept. of Ophthalmology, Rigshospitalet, University of Copenhagen (DK)<sup>3</sup> Steno Diabetes Center, Copenhagen (DK)

**Background and purpose:** A likely explanation for the increase in lens fluorescence with aging and the acceleration of this process in patients with diabetes, is that lens proteins are altered by non-enzymatic glycosylation and the further steps of the Maillard reaction. Thus, the lens fluorescence intensity appears to represent a cumulative index of glycemia over the entire lifetime of the subject. Together with the gradual onset of hyperglycemia in non-insulin dependent diabetes (NIDDM), which usually precedes the clinical detection of the disease by several years, this implies that patients with newly detected NIDDM should have increased lens fluorescence. We have investigated this theory on 14 patients with newly detected NIDDM and 11 age-matched healthy subjects with normal glucose tolerance.

**Results:** Lens fluorescence in 11 of the 14 diabetic patients were higher than the age-related mean plus 2 standard deviations of the healthy subjects. Within both groups lens fluorescence was significantly correlated with HbA<sub>1c</sub>, fasting plasma glucose and the two-hour glucose tolerance test levels. **Conclusion:** The results confirm that lens fluorometry may valuable as a population screening for the presence of NIDDM, although a prospective population study is needed to determine how effectively this can be done.

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DETECTION OF DEXAMETHASONE IN THE AQUEOUS HUMOUR BY <sup>1</sup>H AND <sup>19</sup>F NMR SPECTROSCOPY.Anna Midelfart<sup>1</sup>, Ingrid S. Gribbestad<sup>2</sup>, Anne Dybdahl<sup>3</sup>, Norbert Müller<sup>2</sup>.<sup>1</sup> Department of Ophthalmology, University of Trondheim,<sup>2</sup> MR Centre, SINTEF, UNIMED, Trondheim<sup>3</sup> Department of Biophysics, NTH, University of Trondheim, Norway.

**Purpose.** To apply nuclear magnetic resonance (NMR) spectroscopy to detection of dexamethasone in the aqueous humour from rabbit following topical administration.

**Methods.** After topical administration of 0.1% or 10% dexamethasone sodium phosphate solution, samples of aqueous humour were aspirated, freeze-dried and redissolved in deuterium oxide (D<sub>2</sub>O). They were then analyzed by high resolution <sup>1</sup>H and <sup>19</sup>F NMR spectroscopy to detect the signals from dexamethasone.

**Results.** In the samples obtained from eyes denuded of the corneal epithelium prior to administration of 10% dexamethasone, signals corresponding to the chemical shifts of dexamethasone were identified in both <sup>1</sup>H and <sup>19</sup>F NMR spectra.

**Conclusion.** In spite of its relatively poor sensitivity, NMR spectroscopy appears to be a valuable method for studying drug penetration into ocular tissues since it provides both simultaneous and rapid detection of both metabolites and other substances.

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## EARLY POSTOPERATIVE PUPILLARY MEMBRANE. AN IMMUNOHISTOCHEMICAL STUDY.

GHICONTI I.<sup>1</sup> and PETOUNIS A.<sup>2</sup>

1. Dept. Histopathology "Agia Olga" Hptl. N. Ionia, Athens, Greece.

2. Eye Clinic, Patissia Hptl. Athens, Greece.

**Purpose:** Early Postoperative pupillary membrane (EPPM) is a frequent complication of the most common ocular operations (e.g. cataract, cataract/trabeculectomy combination). An immunohistochemical investigation was performed, in an effort to clarify the underlying pathogenetic mechanism.

**Methods:** The membranes of 12 patients, operated for cataract with or without trabeculectomy, were mechanically removed (forceps) and initially stained with H.E. The three steps PAP method was developed as well, using the following antibodies: L<sub>26</sub>, UCHL<sub>1</sub>, IgG, IgM, fibronectin, fibrinogen, collagen III, and VI.

**Results:** According to our results, the majority of the lymphoid cells were of the T-type. The membrane "matrix" reacted strongly to either fibronectine or fibrinogen. Collagen III was focally evident only, either in the fibroblasts cytoplasm or in the form of stromal deposits. Collagen IV as well as IgG and IgM were negative.

**Conclusions:** It is concluded that the EPPM formation is not associated with immunological mechanisms but a multifactorial process, mainly toxic, is involved, with final result the formation of this fibrinous material, via common inflammatory pathways. This hypothesis is further supported by the ineffectiveness of corticosteroids treatment, which is contrast to the rapid dissolution (within hours) of the membranes following a single intracameral injection of fibrinolytic agents (tPA or streptokinase).

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## ULTRASOUND BIOMICROSCOPY (UBM) OF ANTERIOR SEGMENT STRUCTURES IN VITREOUS SUBSTITUTES-FILLED EYES

AZZOLINI C. PIERRO L. CODENOTTI M. GIORDANO RESTI A. BRANCATO R.

Department of Ophthalmology and Visual Sciences (Chairman: Prof. R. Brancato), Scientific Institute H S. Raffaele, University of Milano (Italy)

**Purpose.**

We evaluated the ultrasound biomicroscopy findings of the anterior segment structures in vitreous substitutes-filled eyes.

**Methods.**

We have considered 60 eyes admitted to our Department for vitreoretinal surgery. High frequency ultrasound biomicroscopy (UBM), 50 MHz transducer, 50 µm of resolution, was used in all cases after surgical procedures.

**Results.**

The UBM morphological appearances and location of different fluid/gaseous vitreous substitutes were described. The relationship between the anterior line of the main silicone oil bubble and the anterior structures of the eye were considered. Differential diagnosis was performed among silicone oil droplets, liquid perfluorocarbon droplets and air/gas bubble. Silicone oil droplets - not biomicroscopically visible - were found in the anterior structures in up to 95% of the silicone oil-filled eyes.

**Conclusions.**

UBM findings allow to well characterize different types of vitreous substitutes when present in the anterior structures of the eye. UBM appears to be a powerful diagnostic tool after vitreoretinal surgery.